

DC/DC CONVERTER

PSC18

USER MANUAL



Notes to this manual

ATTENTION! Read this manual before installing and commissioning the specified module. This manual is a part of the delivered module. Familiarity with the contents of this manual is required for installing and operating the specified module. The function description in this manual corresponds to the stage of technology at the date of publishing. Technical changes and changes in form and content can be made at any time by the manufacturer without notice. There are no obligations to update the manual continually. The rules for prevention of accidents for the specific country and the general safety rules in accordance with IEC 364 must be observed.

The module is manufactured in accordance with applicable DIN and VDE standards such as VDE 0106 (part 100) and VDE 0100 (part 410). The CE marking on the module confirms compliance with EU standards 2006-95-EG (low voltage) and 2004-108-EG (electromagnetic compatibility) if the installation and operation instructions are followed.

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A. Safety instructions



Warning!

Because several components of operating electric devices are charged by dangerous voltage, the improper handling of electric devices may cause accidents involving electrocution, injury, or material damages.

- Operation and maintenance of electrical modules must be performed by qualified skilled personnel such as electricians in accordance with EN 50110-1 or IEC 60950.
 - Install the module only in areas with limited access to unskilled personnel.
 - Before starting work, the electrical module must be disconnected from mains. Make sure that the module is earthed.
 - Do not touch connector pins as they can be charged with dangerous voltage up to 30 seconds after disconnection.
 - Only spare parts approved by the manufacturer must be used.
-

B. Electronic waste disposal

The correct disposal of electronic waste is the responsibility to recycle discarded electronic equipment and is necessary to achieve the chosen level to protect human health and the environment.

In the case of waste disposal of your discarded equipment we recommend to contact a professional waste management company.

1. General information

The Switch Mode Power Supply units PSC18 (named SMPS in the following) supply an output power of 1500W (max. 1800W).

A typical application is a mains-connected secured DC-power supply source feeding the connected battery as well as the consumer load. Hereby, the dynamic regulating performances are particularly advantageous during input voltage and consumer load deviations.

The SMPS unit operates to an IV-characteristic according to DIN 41772/41773 and represents a complete unit for implementation in a 19" assembly carrier according to DIN 41494. The operation and indication elements as well as the plugs are located on the front plate of the unit.

2. Type range

Type designation PSC18/	Article code	Input voltage in V DC	Output voltage in V DC	Output current in A DC
110/24-40 CAN	200-018-740.00	110	24	40
110/48-30 CAN	200-018-750.00	110	48	30
110/60-25 CAN	200-018-760.00	110	60	25
110/110-13.4 CAN	200-018-770.00	110	110	13.4
110/220-6.7 CAN	200-018-780.00	110	220	6.7
110/220-6.7 Relay	200-018-780.01	110	220	6.7
220/24-40 CAN	200-018-840.00	220	24	40
220/48-30 CAN	200-018-850.00	220	48	30
220/60-25 CAN	200-018-860.00	220	60	25
220/110-13.4 CAN	200-018-870.00	220	110	13.4
220/220-6.7 CAN	200-018-880.00	220	220	6.7

Available options and accessories:

- Temperature sensor lead LM 335 (sensor lead in M5 cable shoes with 2m wire)
- CAN-Bus-interface
- One set input and output plug:
24 – 110V DC
220V DC

3. Start up procedure

Before connecting to the input voltage, it should be checked whether the voltage information on the rating plate corresponds to the available voltage and also that the polarity corresponds to the connection plan of the plug. The mains connection is done via a unit plug at the front side. The protective conductor should be generally connected (protection class 1, leakage current ≤ 3.5 mA).

Important:

If a pole of the output side has been earthed, then the SMPS unit should be grounded via the separate PE connection on the front plate at the left side near the DC- output connection.

In this case, the protective conductor at the input side should not be connected via the input plug (earth circuit). This is particularly important for parallel connection without external decoupling diodes.

The DC-output connection is done via a SUB-MIN-D-plug of design 21 WA4 on the front side. The output plug also contains the connections for the signals, sensor cable connections, symmetry regulation and temperature sensor lead.

Note:

The SMPS is equipped with a high capacitive capacitor connected in the output. If the SMPS output in the dead state is connected "hard" to a battery or other parallel operating SMPS, then it results in a considerable surge of charging current, which could lead in welding the plug contacts when the plug is inserted.

This can be avoided by the following proceedings:

- Switch on the SMPS before mounting without the output plug; insert the connection plug only after the adjusted output voltage is attained.
- Disconnecting the DC- circuit with a switch or a fuse
- Charging with a protective resistance (approx. 1 Ohm/V)
- Use of decoupling diodes

After switching off the unit, the capacitors in the input and output circuits can still conduct voltage; the discharge time of the input circuit is approx. four seconds that of the output circuit is approx. 15 seconds.

The SMPS unit operates with natural air cooling. The temperature of the inflow air should not exceed 45°C. If several units are operated via one another in the cabinet, then either forced cooling should be provided or a vertical distance of at least 134 mm = 3 HU should be maintained between the units. Air flaps should be mounted between the mounting levels such that the temperature of the inflow air of the individual mounting levels does not exceed the permissible operation temperature. Cabinet rooms should be designed for a max. ambient temperature of 40°C. Temperatures upto 60°C are permitted for a short time or in the case of forced cooling in the cabinet, but should be avoided in the interest of the lifetime of the unit.

The power loss per unit is approx. 150 W to 170 W (depending on the type).

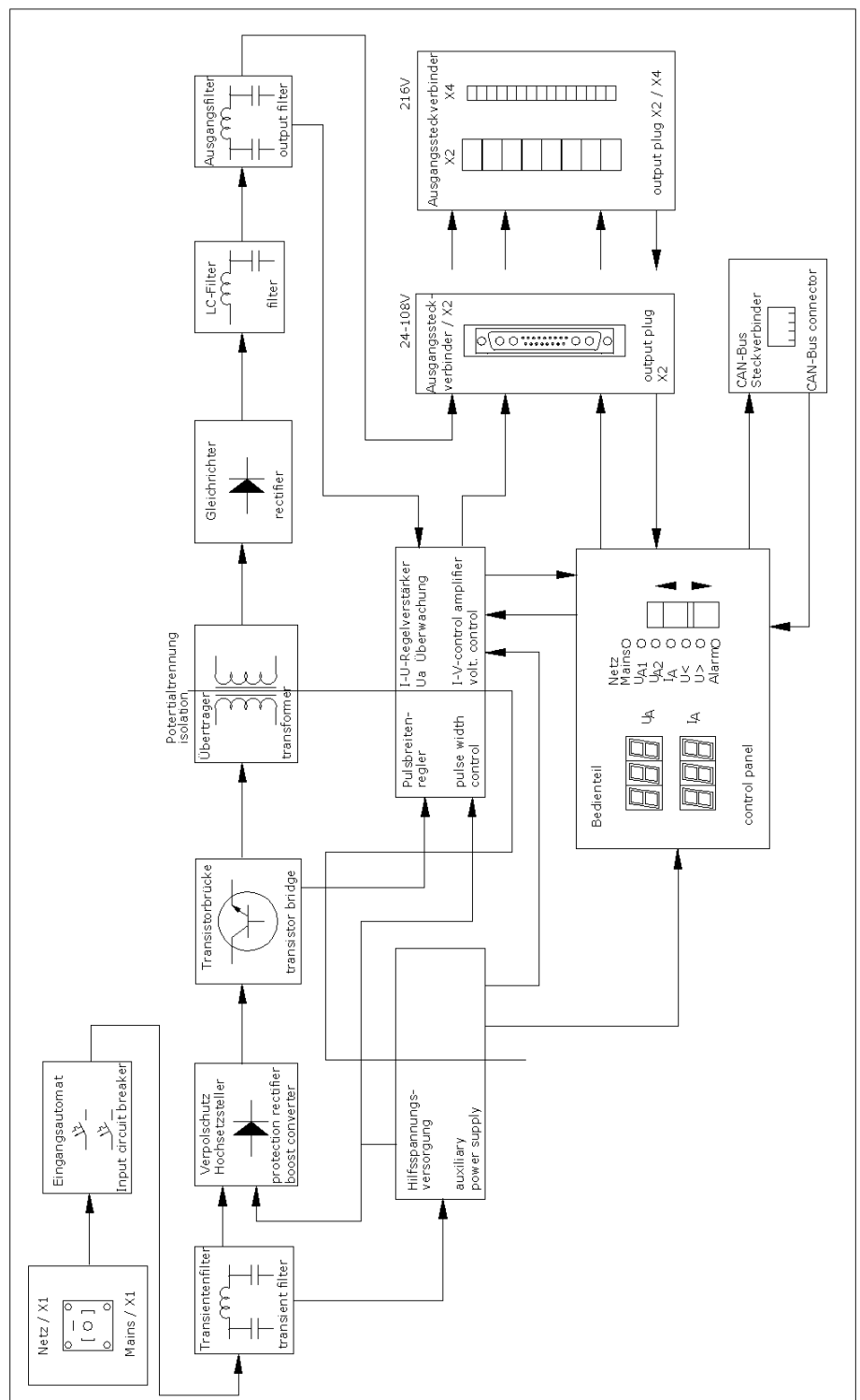
4. Operation

The unit is operated using the operating elements arranged on the front plate. The operating elements are described in the respective sections and are assigned by the labels on the front plate of the unit (see Pt. 7.1/7.2).

5. Functions

5.1 Circuit diagram

Fig. 1:
Circuit diagram
PSC18



5.2 Electrical function description

The SMPS unit consists of the following main functional components:

1. Input filter suppressing the feedback of high frequency interference produced by the unit into the mains as well as for the attenuation of the interference voltages and voltage transients superimposed on the mains.
2. Rectifier (polar protection) with synchronised power controller (operating frequency 100 kHz) for converting the input voltage into a pre-regulated DC- voltage of approx. 380V (DC – Input 110V DC: 170V), regulating the input voltage curve and restricting the inrush current.
3. Transistor bridge circuit for converting the 380 (170)V DC into a pulse-width regulated stepped voltage with a frequency of 100 kHz.
4. Power transmitter to the potential separation and voltage adaptation at the secondary side
5. Rectifier with fast switching diodes
6. LC filter for smoothing the DC- voltage ripple at the rectifier output
7. Output filter for smoothing the interfering voltages on the output voltage
8. Auxiliary current supply for the internal power supply to the control components with potential separation at the primary and secondary side.
9. Regulating line with potential separation by optocoupler.
10. Operating component with parameter adjustments, signalling, monitoring and indication elements

5.2.1 Electrical insulation

Due to the design of the unit and of the components as well as design of separated connections of the input and output circuits

- the SMPS series with $U_A \leq 60$ V DC fulfil the EN 60950 and VDE 0100 Standard; i.e. protection against shock currents due to the functional extra low voltage with a safe electrical insulation.
- the SMPS series $U_A > 60$ V DC satisfy the safe electrical insulation up to $U_A = 220$ V DC according to EN 60950 and VDE 0160 Standard.

5.2.2 Input

The input is protected by a 2-pole circuit breaker. This circuit breaker is also used as on/off-switch.

The MCB is situated before the input filter. The SMPS has a current limitation which limits the inrush current to the level of nominal input current.

5.2.3 Output

The output-characteristic is an IV-characteristic according to DIN 41772 or DIN 41773. An active current distribution or a characteristic curve ($\pm 1\%$ for $100\% I_{nom}$) can be selected for parallel operation (factory adjustment: characteristic curve)

The output is continuously short circuit proof due to a constant current regulation.

5.2.4 Output voltage dynamic behaviour

In case of load changes in the load between 10% and $90\% I_{nom}$ or 90% and $10\% I_{nom}$ the dynamic voltage deviation is $\max. \pm 3\%$ and is compensated to the static limits within $\max. 1.5\text{ ms}$.

5.2.5 RFI suppression

The SMPS unit fulfils the conditions of the RFI class "B" according to VDE 0878 T 1 or EN 5501 /55022. When measured with a filter according to CCITT-recommendations, the output ripple is psophometric $< 1\text{ mV}$ (24V), $< 1.8\text{ mV}$ (48V) as well as $< 2\text{ mV}$ (60V).

5.2.6 Parallel operation mode

Due to the parallel operation ability of the SMPS it is possible to design the redundant cabinets according to the principle $n+1$.

Due to the 1% characteristic curve (factory adjustment) a load distribution of about $\pm 10\%$ and due to the optional **active current distribution** (see pt. 7.3, factory adjustment necessary), about $\pm 5\%$ is attained.

During the adjustment of the characteristic curve, the load distribution can be optimised by increasing the output voltage in the unit having the smallest load current and decreasing the output voltage in the unit having the largest load current (see pt. 5.4).

The selective monitoring of the individual SMPS is possible only with internal or external decoupling diodes in the output.

The delivery of units with an output voltage $\leq 60\text{ V DC}$ with already incorporated internal decoupling diodes is optional. The units are labelled with p (internal decoupling diode in the plus branch) or m (internal decoupling diode in the minus branch).

5.2.7 CAN-Bus interface

The DC/DC converter is equipped with a serial CAN-Bus interface. Two CAN connectors (RJ11, 6-pole) are fitted at the front side of the 24V - 110V version. For the 220V version the CAN-Bus connection is integrated in the front side connector **X4**.

Several modules in a system or parallel connection can be controlled and monitored via CAN-Bus by a central DC controller unit.

The following parameters of a specific DC/DC converter unit can be controlled or monitored:

- Output voltage
- Output current
- Module status

Furthermore, the module receives all threshold values via CAN-Bus from the DC controller unit.

REMARK: If several paralleled DC/DC converters are controlled by a central DC controller unit, it is important to assign an explicit CAN-Bus address to each individual module (see section 5.4).

5.3 Monitoring

5.3.1 Mains voltage monitoring

Mains voltage monitoring; signaling with LED "Mains", criterion: output voltage of step-up-converter ≥ 370 V (165V), at the same time operation monitoring of step-up-converter (equivalent to main voltage of appr. ≥ 195 (100)VAC; depends on load). The LED is dark if mains voltage low or the step-up-converter is out of order. This signal is included in collective failure signal. Additional there is an optocoupler signal (mains O.K.)

5.3.2 Operation monitoring

Functional monitoring; signaling with LED "U_{A1}", criterion: output voltage ≥ 97 % of adjusted output voltage without constant current regulation and ≥ 85 % of the adjusted output voltage with constant current regulation. The signaling threshold of this monitoring follows the adjusted nominal output voltage automatically. This signal is included in collective failure signal of rectifier. Additional there is an optocoupler signal (U_A O.K.) At operation with internal decoupling diodes the voltage before diodes will be measured.

5.3.3 Output voltage low

Output voltage low monitoring; signaling with LED "U<", criterion: output voltage is higher than adjusted level U<; This signal is included in collective failure signal. It has its own relay contact on signaling connector too. If the voltage value is O.K. Pin 13 and Pin 17 of X2 or Pin 11 and Pin 15 of X4 (220V – output voltage) are closed.

5.3.4 Output voltage high

Output voltage high monitoring; signaling with red LED "U>", criterion: output voltage higher than adjusted level U>; this signal is included in collective failure signal of SMPS. If there is an error the LED burns and the SMPS switches off internal. This protective unit has an automatic locking and should be set back with the mains switch or remote ON/OFF.

5.3.5 Protection against overheating

Protection against overheating; signaling with red LED "Alarm", criterion: temperature of heat sink > 90°C. The over-temperature protection switches OFF the SMPS when the limited temperature is attained.

This signal is included in collective failure signal. You have to reset the unit by ON/OFF switch.

5.3.6 Signals

The signals "U_A O.K.", "Mains O.K." and "Constant Current Mode I_{const}" are optocoupler signals with a loading of 30 V/5 mA. The optocouplers switches off at error. The collective failure signal is delayed for approx. 10 sec. The relay contacts between Pin 14 and Pin 15 of X2 and Pin 12 to Pin 14 of X4 (220V – Output voltage) are open and between Pin 15 and Pin 16 are closed at error.

5.4 Output and threshold adjustment

The adjustment of output values and monitoring thresholds is very easy. All values are adjusted using the front keys; the values are indicated on the digital displays.

In normal operation the top display shows the output voltage (VO1, VO2 or VO3 depending on the selected operation mode) and the bottom display shows the output current (I_o).

In the adjustment mode, the top display indicates the name of the parameter whereas the bottom display indicates the related value.

For any adjustment please follow these instructions:

- press both keys UP/DOWN (↑↓) together for a short time; the SMPS changes to adjustment mode
- press the key UP (↑) or DOWN (↓) to change the adjustment parameter (see also table on bottom)
- press both keys UP/DOWN (↑↓) together for a short time; the SMPS changes to value change mode
- press the key UP (↑) or DOWN (↓) to change the adjustment value (if you hold the key the value changes quicker)
- press both keys UP/DOWN (↑↓) together for a short time; the SMPS changes back to adjustment mode (at this moment the changed value is stored)
- press both keys UP/DOWN (↑↓) for approx. 3 sec. to change back to operation mode

5.4.1 Adjustable parameters in adjustment mode

Display	Parameter
Uo1 (=U _{A1})	tripple charge voltage
Uo2 (=U _{A2})	boost charge voltage (look also cap. 6.5)
Uo3 (=U _{A3})	voltage at discharge test (look also cap. 6.4)
I _o (=I _A)	output current
U<	output voltage low threshold (look also cap. 5.3.3)
U>	output voltage high threshold (look also cap. 5.3.4)
t	coefficient of temperature for temperature compensation of charge voltage (look also cap. 6.2)
Adr	change CAN-Bus address

The threshold values for mains/step-up-converter and over heating are not changeable.

The threshold values of DC voltage low (V<) and DC voltage high (V>) can be individually set within a limited adjustment range.

For more information regarding the adjustment ranges and factory preset values see section 10. "Technical data".

6. External functions

6.1 Output voltage sensor leads

Using sense links for output voltage you are able to compensate voltage losses due to wires or diodes.

The max. regulation difference is approx. 4 % of the nominal voltage.

Interruption on sense links, confusing of poles or short circuit can't damage the rectifier. At interrupt it can be a voltage increase of max. 4%.

6.2 Temperature compensation of charging voltage

At using of closed batteries we recommend the temperature controlled compensation of charge voltage. Connect an external active temperature sensor (option) to the related signaling connector. The coefficient of temperature normally is -4 mV/K per cell (within a temperature range of 0-50 °C). The basic temperature is 20°C. The coefficient can be adjusted in a range of -1 to -6mV/K per cell (see cap. 5.4). The sensor should be connected using a 2-pole wire (0.25 mm²). It can be mounted directly on top of battery or on battery poles. At big distances (> 2m) we recommend a shielded wire with connection of the shield on SMPS ground.

6.3 External switch ON/OFF

The SMPS can be switched on/off by an external signal. The input is free of potential by an optocoupler and fulfills the supposition for safe electrical decoupling to mains and output side. The signaling voltage is 10-24 V, the internal resistance 2.7 kOhm. The input is protected against confusing the poles. At higher supply voltages the current in the control circuit has to be limited to 5-7mA with a resistor (for instance 6.8 kOhm at 48/60V DC).

6.4 Discharge test

It is possible to test the capacity of a battery which operates in parallel to the module(s). To select the discharge test mode you have to connect **-Vo** to pin 2 of the output connector **X2** (see section 7.3). The discharge test voltage can be adjusted by the user (parameter VO3; see section 5.4). If the discharge test mode is active, the LED V₀₁ is ON; LED V₀₂ is OFF.

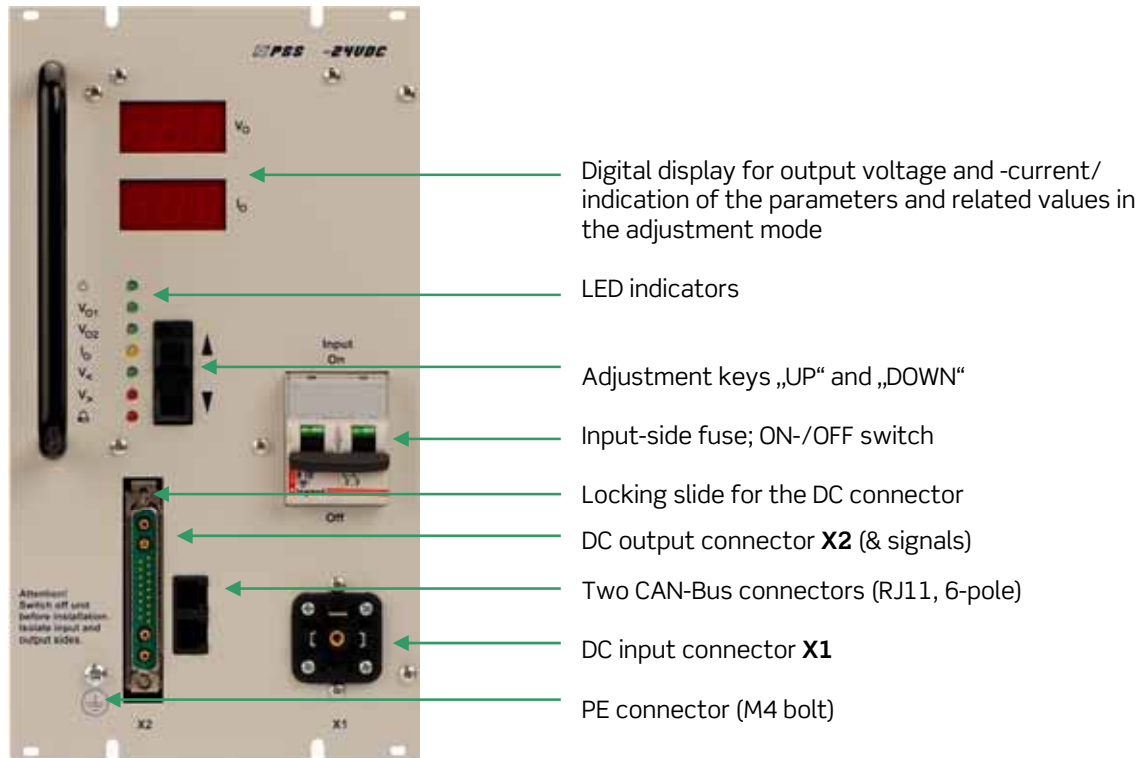
6.5 Boost charge mode

The module has a second charge line (boost charge line). To select this mode you have to connect **+Vo** to pin 2 of the output connector **X2** (see section 7.3). The boost charge mode is signaled by LED V₀₂. The voltage value can be adjusted by the user (see section 5.4).

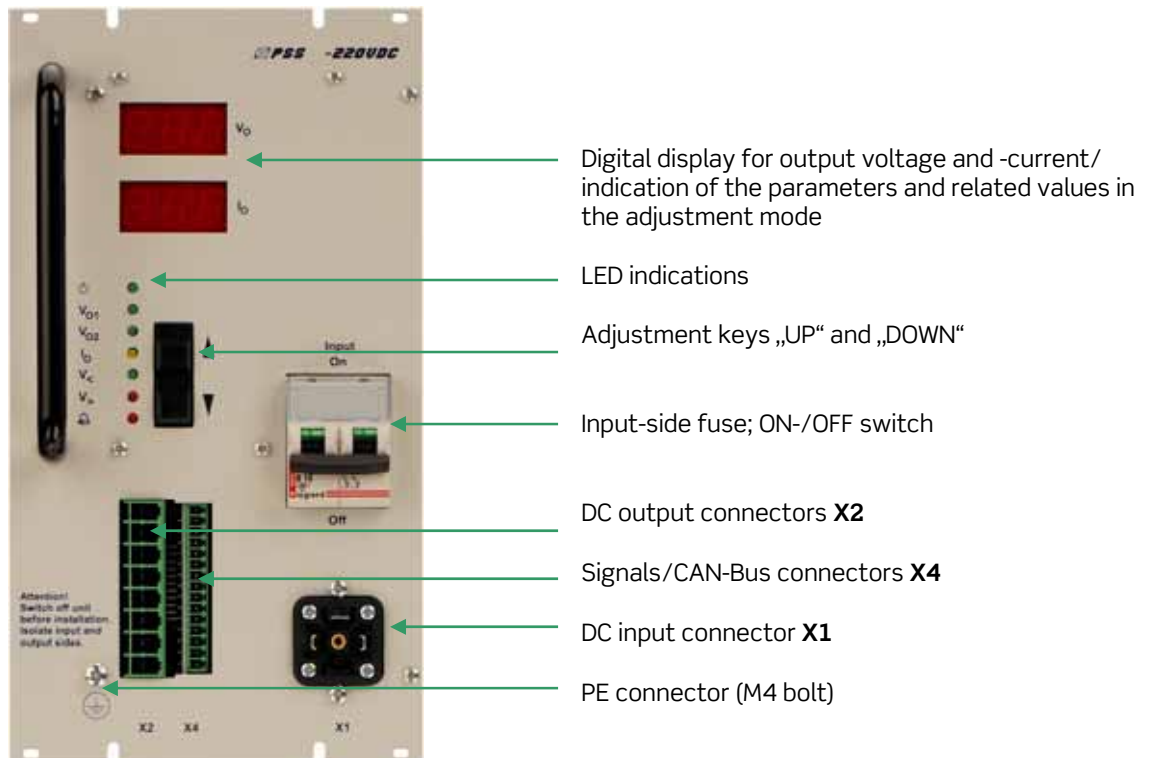
NOTE: For 60/110/220V units: For the connection to +Vo an additional series resistor is to be used (60 V: 18kOhm; 110 V: 56kOhm; 220V: 150kOhm).

7. Operation elements and connectors

7.1 Front view/operation elements 24/48/60/110V version



7.2 Front view/operation elements 220V version



PSC18

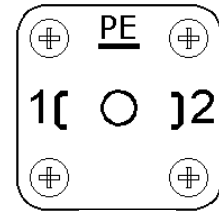
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7.3 Electrical connectors

X1: DC input (GDM-connector) for **all** PSC18 versions

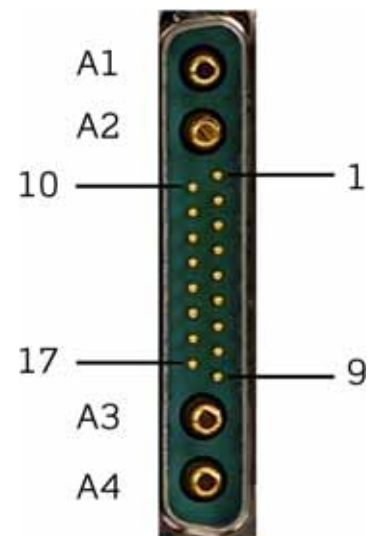
X1, Pin	Function
1	+ DC - Input
2	- DC - Input
PE	PE



X1

X2: DC output and signalling contacts/SUB-MIN-D-connector 21WA4 (**24, 48, 60, and 110V** version)

X2, Pin	Function
A1	(+) - output
A2	(+) - output (additional for $I_A \geq 40$ A)
A3	(-) - output (additional for $I_A \geq 40$ A)
A4	(-) - output
1	(+) - output voltage sense link
2	signal input discharge test mode / boost charge mode ¹⁾
3	optocoupler emitter
4	optocoupler collector "Mains O.K."
5	optocoupler collector "U _A O.K."
6	optocoupler collector "I _A "
7	temperatur sensor (+) ²⁾
8	control wire for active current sharing ³⁾
9	(-) - output voltage sense link
10	analog ground (for temperature sensor (-), active current sharing)
11	(+) external switch ON/OFF ⁴⁾
12	(-) external switch ON/OFF
13	relay contact V< , N/O ⁵⁾
14	relay contact collective failure , N/O
15	relay contact collective failure , COM
16	relay contact collective failure , N/C
17	relay contact V< , COM



X2

LEGEND:

1)

tri-state-input:

pin 2 on -U_A = **discharge test mode**

pin 2 on +U_A = **boost charge mode**

Note:

For 60/110V units: For the connection to +Vo an additional series resistor has to be used (60 V: 18kOhm; 110 V: 56kOhm).

2)

connection of temperature sensor using 2-pole wire to pin 7(+) and pin 10 (-)

Note:

If several modules are paralleled, pin 7 and pin 10 of each unit has to be connected.

3)

At active current sharing mode of paralleled units pin 8 of each module has to be connected. The Analog – GND (pin 10) has to be connected too.

ATTENTION: If active current sharing mode is enabled, the use of external decoupling diodes and fuses as well in minus on the output side is **not** allowed.

4)

External switch ON/OFF with optocoupler: internal resistor 2.7kOhm, $I_{min} \leq 5 \text{ mA}$, $I_{max} = 10 \text{ mA}$

Note:

The input is potential free with safe electrical decoupling to primary side and with 500V DC to secondary side.

5)

The relay outputs are potential free with safe electrical decoupling to primary side and with 500V DC to secondary side.

For the 220V version, the DC output and signal connectors are separated.

X2: DC output (8xCOMBICON 4mm²) for **220V** version

X2, Pin	Function
1	(+) - output
2	(+) - output (additional for $I_A \geq 40 \text{ A}$)
3	(+) - voltage sense link
4	control wire for active current sharing ⁶⁾
5	BUS ground
6	(-) - voltage sense link
7	(-) - output (additional for $I_A \geq 40 \text{ A}$)
8	(-) - output



X4: Signals (connector 15 x COMBICON 1.5mm²):

Pin assignment of **X4** for PSC18/220V with **signalling relay** (without CAN-Bus)

X4, Pin	Function
1	(+) external switch ON/OFF ⁴⁾
2	(-) external switch ON/OFF
3	optocoupler emitter
4	optocoupler collector "Mains O.K."
5	optocoupler collector "U _A O.K."
6	optocoupler collector "I _A "
7	BUS ground
8	signal input discharge test mode / boost charge mode ¹⁾
9	temperature sensor (+) ²⁾
10	control wire for current sharing mode ³⁾
11	relay contact V< , NO ⁵⁾
12	relay contact collective failure , NO ⁵⁾
13	relay contact collective failure , COM
14	relay contact collective failure , NC ⁵⁾
15	relay contact V< , COM



Pin assignment of **X4** for PSC18/220V with **CAN-Bus** (without signalling relay)

X4, pin	Function
1	(+) external switch on/off ⁴⁾
2	(-) external switch on/off
3	optocoupler emitter
4	optocoupler collector "Mains O.K."
5	optocoupler collector "VO O.K."
6	optocoupler collector "IO"
7	BUS – GND
8	signal input discharge test mode / boost charge mode ²⁾
9	temperature sensor (+) ²⁾
10	control wire for current sharing mode ³⁾
11	CVCC +
12	CAN-H
13	CAN-L
14	CVSS -
15	Not connected



LEGEND:

1)

tri-state-input:

pin 8 on -V_O = **discharge test mode**

pin 8 on +U_A = **boost charge mode**

Note:

For 220V units: For the connection to +V_O an additional series resistor has to be used (220V: 150kOhm).

2)

connection of temperature sensor with 2pole wire to pin 9(+) and pin 7 (-)

Note:

If several modules are in paralleling then the pin 7 from every unit has to be closed.

3)

At active current sharing mode of paralleling units the pin 10 of every module has to be connected together. The Analog – GND (pin 7) has to be connected too.

ATTENTION!

If active current sharing mode is enabled, the use of external decoupling diodes and fuses as well in minus on the output side are **not** allowed.

4)

External switch ON/Off with optocoupler: internal resistor 2.7kOhm, I_{min} ≤ 5 mA, I_{max} = 10 mA

Note:

The input is free of potential with saved electrical decoupling to primary side and with 500V DC to secondary side.

5)

The relay outputs are free of potential with saved electrical decoupling to primary side and with 500V DC to secondary side.

6)

At active current sharing mode of paralleled units, pin 4 (DC - Output) of each module has to be connected together. The BUS – GND (pin 5) has to be connected too.

ATTENTION!

You can use either version **6)** or **3)** of wiring for active current sharing mode, not both in combination!

8. Maintenance

In general, the module is maintenance-free.

A yearly inspection with following checks is recommended:

- Mechanical inspection
- Removal of dust and dirt, especially on radiator surfaces
- Check for internal dust or humidity

Attention! Dust combined with moisture or water may influence or destroy the internal electronic circuits.

Dust inside the unit can be blown out with dry compressed air.

The interval between the checks depends on ambient conditions of the installed module.

9. Trouble shooting

Only skilled and trained technical personnel should carry out the necessary trouble shooting operations at the unit.

9.1 No output voltage

- Is the DC input voltage present?
- Is the DC input switch in on-position?
- Is the input plug correctly connected?
- Is the polarity correct or short circuit at the output?
- Paralleled units: incorrect polarity at external decoupling diodes?
- Monitoring of output voltage high V> signalize an error (lights LED V>?); switch the unit off and on again and check the adjusted value of V> (see section 5.4)!

If the module still does not work even though all checks have been done, contact your sales agent or the ELTEK VALERE DEUTSCHLAND service department.

9.2 Deviation of output voltage

- Operates the module in constant current mode (overload)? >Reduce the load!
- Adjustment of output voltage value VO wrong? >Adjust the output voltage to nominal values (see section 5.4)!
- Cable break at external sense links?
- Voltage losses at decoupling diodes on output side? >adjust the output voltage to higher level or use sense links!

If the module still does not work even though all checks have been done, contact your sales agent or the ELTEK VALERE DEUTSCHLAND service department.

10. Technical data

10.1 General technical data

Nominal input voltage	110V DC +30/-15%; 220V DC +20/-15%
Monitoring input voltage	LED - signals $U_E < 195V$ DC (100V DC) Varistor protection $U_E > 270V$ DC (150V DC)
Inrush current	16A at 10ms
Recommended mains fuse	gL 16A
Output characteristic	IV line acc. to DIN 41772/ DIN 41773
Emission	acc. to EN50081-1
conducted interference voltage	acc. to EN 55011/EN55022 class "B"
radiated electromagnetic fieldstrength	acc. to EN 55011/EN55022 class "B"
Immunity	acc. to EN50082-2
cabinet	ESD-test acc. EN61000-4 part 2; 6kV contact; 8kV air discharge HF-field acc. to EN61000-4 part 3; 10V/m (30MHz- 1GHz)
power wires	Burst-test acc. to EN61000-4 part 4; 2kV Surge-test acc. to EN61000-4 part 5; 4kV unsymmetric; 2kV symmetric
signal wires	Burst-Test acc. to EN61000-4 part 4; 2kV Surge-Test acc. to EN61000-4 part 5; 2kV unsymmetric
Protection (electr.)	with safed decoupling at $U_A \leq 60V$ DC acc. to VDE0100 part 41011.83 cap. 4.3.2; at $110V \text{ DC} \leq U_A \leq 220V$ DC acc. VDE 0160 5.88 cap. 5.6
Dynamic voltage difference	$\leq 3\%$ at load changes between 10 % - 90 % - 10 % of nominal output current (regulation time ≤ 1 ms)
Short circuit capability	continuous short circuit proof (constant current controlling)

Protection / monitoring / signaling	2-pole MCB (220V DC:10A; 110V DC:20 A) at front;
mains monitoring „Mains“	green LED
operation monitoring „U _{A1} “	greenLED
output voltage low „U<„	green LED with relay contact
output voltage high „U>„	red LED
constant current mode „I _A “	yellow LED
over temperature	blinking red LED
digital instruments	
for current:	displays values from 00.1 to 99.9 A DC
for voltage:	displays values from 00.1 to 999 V DC
External functions	
signal U<	with relay contact (max. contact load: 24V DC/1A; 120V AC/0.5A)
collective failure	with relay contact (approx. 10sec. delayed) (max. contact load: 24V DC/1A; 120V AC/0.5A)
control wire	for active current sharing
discharge test mode / boost charge mode	(voltage values adjustable)
temperature controlled compensation of charge voltage coefficient of temperature	-4mV/K per cell (adjustable) with external sensor (optional)
external sense links for output voltage	signaling with optocoupler „U _A O.K.“ , „Mains O.K.“ and „I _{const} “
external switch	ON/OFF function
Operation in paralleling	up to 20 modules possible, load sharing approx. 10%
Construction	19"-cassette to mount in 19" subracks acc. to DIN 41 494
Protection (mech.)	IP 20
Cooling	temperature controlled fan cooling
Ambient temperature	0°C to 45°C, 0°C to 40°C at mounting in cabinet

Storage temperature	-30°C to + 70°C
Ambient conditions	IEC 721 part 3-3 class 3K3 / 3Z1 / 3B1 / 3C2 / 3S2 / 3M2
Max. operation altitude	1500 m
Mechanical construction	acc. to VDE 0160 rev. 5.88 cap. 7.2.2
Painting	color RAL 7035 (front panel only)
Dimensions	262 x 142 x 285 mm H x W x D (1/3-19" x 6U)
Connectors	
Mains connector X1	3-pole, type GDM 2011
DC connector X2	24-110V DC: SUB-Min-D-connector 21WA4 220V DC: front terminals 8x4mm ² , COMBICON (DC-output); front terminals 15x1.5mm ² (signal contacts)
None-fused earthed conductor	bolt M4

PSC18

User Manual

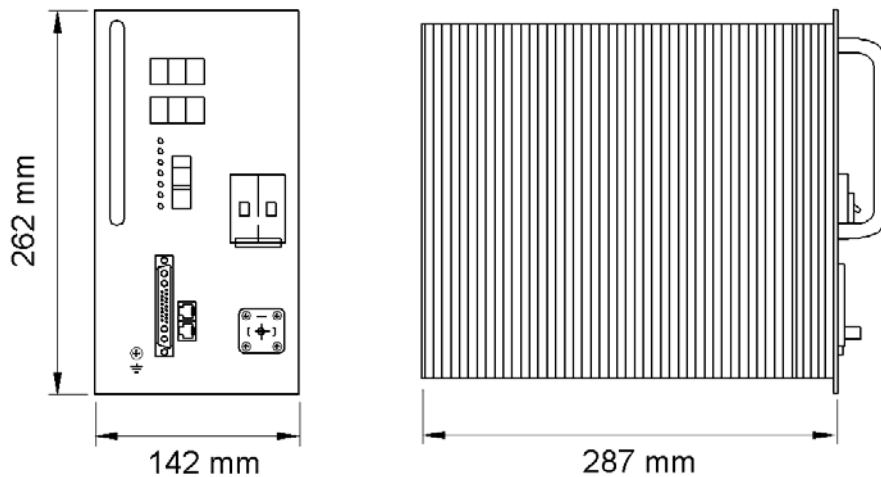
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10.2 Type specific data

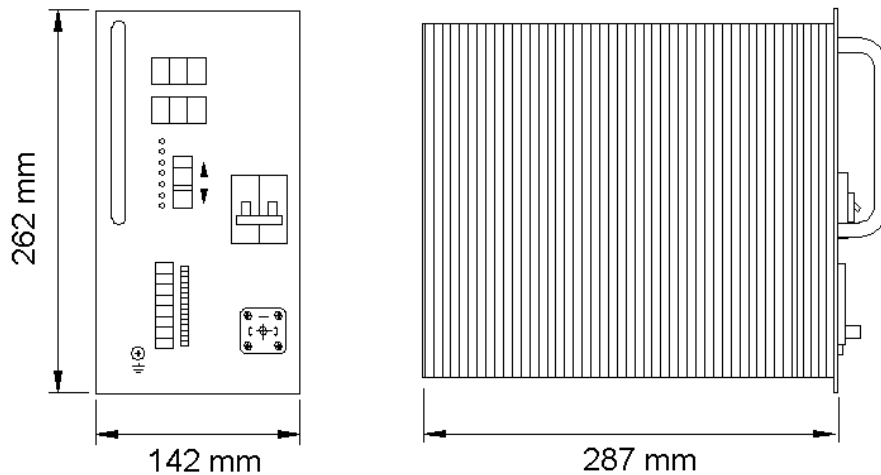
Type G110 G24/40 G220 G24/40	G110 G48/30 G220 G48/30	G110 G60/25 G220 G60/25	G110 G110/13.3 G220 G110/13.3	G110 G220/6.7 G220 G220/6.7
Name in brief PSC18 /110/24-40 /220/24-40	PSC18 /110/48-30 /220/48-30	PSC18 /110/60-25 /220/60-25	PSC18 /110/110-13.3 /220/110-13.3	PSC18 /110/220-6.7 /220/220-6.7
Input current 9.8 A DC 4.9 A DC	14.5 A DC 7.3 A DC	15.2 A DC 7.6 A DC	14.9 A DC 7.4 A DC	14.9 A DC 7.4 A DC
Output voltage U_{A1} in V DC Adjusted value 24.0 ± 1 % Adjusting range 23.4 to 28.8	48.0 ± 1 % 46.6 to 57.6	60.0 ± 1 % 58.5 to 72.0	110.0 ± 1 % 105 to 130	220.0 ± 1 % 211 to 260
Output voltage U_{A2} in V DC (Boost charge) Adjusted value 28.8 ± 1 % Adjusting range 24 bis 30	57.6 ± 1 % 48 to 60	72.0 ± 1 % 60 to 73	129.6 ± 1 % 108 to 135	259.2 ± 1 % 216 to 270
Output voltage U_{A3} in V DC (discharge test) Adjusted value 22.2 ± 1 % Adjusting range 20.4 bis 24	44.4 ± 1 % 40.8 to 48	55.5 ± 1 % 51 to 60	99.9 ± 1 % 91.8 to 108	200 ± 1 % 184 to 216
Output current I_A in A DC Adjusted value 40 ± 2 % Adjusting range 20 bis 40	30 ± 2 % 15 to 30	25 ± 2 % 12.5 to 25	13.3 ± 2 % 6.7 to 13.4	6.7 ± 2 % 3.4 to 6.7
Type of battery 12 Pb - cells	24 Pb - cells	30 Pb - cells	54 Pb - cells	108 Pb - cells
Efficiency 90 %	91 %	91 %	91 %	91 %
Voltage wave ≤ 20 mV _{SS}	≤ 20 mV _{SS}	≤ 20 mV _{SS}	≤ 20 mV _{SS}	≤ 20 mV _{SS}
Error volt. according to CCITT ≤ 1.0 mV	≤ 1.8 mV	≤ 2.0 mV		
Monitoring				
DC-Undervoltage U< in V DC Threshold value 20.4 Adjusting range 19.2 to 24	40.8 38.4 to 48	51.0 48 to 60	91.8 86.4 to 108	184 173 to 216
DC-Overvoltage U> in V DC Threshold value 30 Adjusting range 26 to 30	60 52 to 60	75 66 to 75	135 119 to 135	270 238 to 270

11. Dimensionsonal drawings

11.1 Dimensions - PSC18 (24, 48, 60 and 110V version)



11.2 Dimensions - PSC18 (220V version)





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